# UNITED STATES PATENT AND TRADEMARK OFFICE

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| 10/671,346 | 09/24/2003 | Mohammad Jaber Borran | 088245-0108 | 7074 |

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| EXAMINER |
|---|
| BURD, KEVIN MICHAEL |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) ☒ Responsive to communication(s) filed on *08 June 2009*.

2a) ☒ This action is **FINAL**.  2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) ☒ Claim(s) *41,42,45-50,53-58 and 61-75* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *41,42,45-50,53-58 and 61-75* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All  b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

1.      This office action, in response to the remarks filed 6/8/2009, is a final office

action.


### Response to Arguments

2.      Applicant's arguments have been fully considered but they are not persuasive.

De Gaudenzi discloses minimizing the geometrical distance between the pairs of

points of the digital constellation as stated in the previous rejection of the claims. De

Gaudenzi does not disclose the geometrical distance is the Kullback Leiber distance.

However, Dabak discloses optimizing constellation points for non-Guassian

communication problems as stated in the previous office action. By utilizing the Kullback

information rather than the geometrical information, noise amplitude distribution as it

relates to signal set choice can be utilized. For these reasons and the reasons stated in

the previous office action, the rejection of the claims is maintained and stated below.

Won discloses transmitting information from the antennas. The signal

constellation of the combination is selected based on the modulated transmitted signal.

The transmitted signal will be affected by the number of the transmit antennas being

utilized in the communication system. The selecting of the signal constellation will be

based on (dependent on) a number of transmit antennas used to transmit the signal.

For these reasons and the reasons stated in the previous office action, the rejection of

the claims is maintained and stated below.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3.　　Claims 41, 42, 45, 49, 50, 53, 57, 58 and 61-75 are rejected under 35 U.S.C.

103(a) as being unpatentable over De Gaudenzi et al (US 2006/0209982) in view of

Dabak et al "Signal Constellations for Non-Gaussian Communication problems"

Statistical Signal and Array Processing. Minneapolis, April 27-30 1993. Proceedings of

the International Conference on Acoustics, Speech, and signal Processing (ICASSP),

New York, IEEE, US, VOL. 4, pages 33-36.

Regarding claims 41, 42, 45, 49, 50, 53, 57 and 58, De Gaudenzi discloses a

method and apparatus for transmitting a signal. A nominal signal to noise ratio for

transmitting the digitally modulated signal is determined (claim 1). A stream of

modulated symbols are generated (claim 1) according to amplitude and phase shift

keying coded modulation (abstract). A signal constellation is chosen so as to maximize

a minimum geometrical distance between the pairs of points of the digital constellation

(claim 1). The modulated symbols are then transmitted to the receiver (figure 11). De

Gaudenzi does not disclose the method and device determines the distance between

the constellation points as a function of a Kullback-Leiber distance. However, Dabak

discloses a method of computing optimum signal sets (abstract). By optimizing the

constellation points for non-Gaussian communication problems, the problems can be

overcome and proper communication between users can be achieved. This optimization

is achieved since the Kullback information can be used to express how performance

varies with noise amplitude distribution and with signal set choice (III). Additional

information regarding the Kullback information is provided in heading II. It would have

been obvious for one of ordinary skill in the art at the time of the invention to combine

the teachings of Dabak into the method and device of De Gaudenzi for the reasons

stated above.

Regarding claims 61-75, the combination disclosed the claimed limitations. Claim

1 of De Gaudenzi recites mapping the modulation symbols where the signal

constellation comprising a number of digital signal points equally spaced on at least two

concentric rings having respective predetermined radii, where the ratio of the radii of the

concentric rings is chosen so as to maximize the minimum geometrical distance

between pairs of points of the digital signal constellation. Dabak discusses the Kullback

information.


4.      Claims 46, 47, 48, 54-56 and 56 are rejected under 35 U.S.C. 103(a) as being

unpatentable over De Gaudenzi et al (US 2006/0209982) in view of Dabak et al  "Signal

Constellations for Non-Gaussian Communication problems" Statistical Signal and Array

Processing. Minneapolis, April 27-30 1993. Proceedings of the International Conference

on Acoustics, Speech, and signal Processing (ICASSP), New York, IEEE, US, VOL. 4,

pages 33-36, further in view of Won (US 7,269,436).

Regarding claims 46-48 and 54-56, the combination of De Gaudenzi and Dabak discloses the method and apparatus stated above in paragraph 3. The combination does not disclose the number of transmit antennas is determined from a message received over the wireless channel. Won discloses the transmitter can estimate the channel covariance matrix using a preamble transmitted from the receiver. The transmitter can also update the number of antennas and the power allocation according to the eigenvalues of the estimated covariance matrix (column 7, lines 42-48). Therefore, the number of transmit antennas is determined from the information in the preamble (header) of the received signal. Won discloses transmitting information from the antennas. The signal constellation of the combination is selected based on the modulated transmitted signal. Therefore, the selecting of the signal constellation is based (dependent on) a number of transmit antennas used to transmit the signal. It would have been obvious for one of ordinary skill in the art at the time of the invention to combine the teaching of Won into the method and apparatus of the combination of De Gaudenzi and Dabak. Controlling the number of antennas used according the channel conditions will minimize the power consumed by the transmitter, reducing the cost of operating the transmission system.

## Conclusion

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action.  In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action.  In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Kevin M. Burd whose telephone number is (571) 272-

3008.  The examiner can normally be reached on Monday - Friday 9 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, David C. Payne can be reached on (571) 272-3024.  The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kevin M. Burd/
Primary Examiner, Art Unit 2611
8/11/2009